48-12-14/15

Investigation of the Lives of Low Nuclear Levels Excited in Electron-Captures

incidences of the characteristic X-rays with the γ-rays ($X\gamma$- and γX-coincidence) or with the electrons of internal conversion (Xe- and eX-coincidence) were measured here. The transitions $Tu^{167} \rightarrow Er^{167}$, $Gd^{145} \rightarrow Eu^{145}$, $Eu^{147} \rightarrow Sm^{147}$, $Ir^{190} \rightarrow Os^{190}$ were investigated. It is shown that in the Er^{167}-nucleus the electric quadrupole-transition is highly accelerated, whereas the magnetic dipole-transition is highly retarded. The former is natural for an Er^{167}-nucleus with 17 neutrons over the filled shell and which belongs to the greatly deformed nuclei. The sound transition belongs to the group of retarded magnetic dipole-transitions (reference 19). The cause of the retardation is apparently connected with the collective nature of the magnetic transition. The interpretation of the measurement-results for the $Gd^{145} \rightarrow Eu^{145}$ -transition is not only not possible because the multipolarity of the γ-transitions of Eu^{145} is known, but also because there exists uncertainty in the identification of the γ-rays (115 keV) investigated. The obtained value for the upper limit of the life of the first excited state of Sm^{147}, on the assumption that the transition (E2 +M 1) is a mixed type, for the time of radiation with the taking into account of conversion yields a somewhat higher value for theupper limit $\tau_\gamma < 5.10^{-10}$ sec. It is shown that the result obtained

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Investigation of the Lives of Low Nuclear Levels Excited in Electron-Captures 48-12-14/15

here contradicts the assumption that E2 +M 1 is a mixed type. $T_\gamma = 1{,}2 \cdot 10^{-9}$ sec is obtained from the observed value for the average life of the first excited state of $_{76}Os^{190}$ with the taking into account of the conversion on all shells and on the assumption that $\alpha = 0{,}71$.

B. S. Dzhelepov and collaborators, A. A. Bashilov and collaborators, as well as A. N. Murin and collaborators before publication placed data on their experiments with the isotopes investigated here at the authors' disposal. V. P. Dzhelepov and the personnel of the synchrocyclotron participated in the work. There are 8 figures, and 23 references, 12 of which are Slavic.

ASSOCIATION: Physico-Technical Institute AN USSR, Leningrad
(Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR)

AVAILABLE: Library of Congress

Card 3/3

56-6-37/47

AUTHOR: Berlovich, E. Ye.

TITLE: Quadrupole Moments of the Even Isotopes of Osmium and Lutetium 175 (Kvadrupol'nyye momenty chetnykh izotopov osmiya i lyutetsiya 175)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1957, Vol. 33, Nr 6, pp. 1522 - 1523 (USSR)

ABSTRACT: For the 137 KeV-level in the Os^{186} nucleus a radiation life of $(1,44 \pm 0,5) \cdot 10^{-9}$ sec was measured. Herefrom a computed quadrupole moment of Os^{186} of

$$Q_0 = (6,4 \pm 0,1) \cdot 10^{-24} \text{ cm}^2$$

is obtained. For the 113 KeV-level in the nucleus Lu^{175} a limit value for the life of $\leq 6,8 \cdot 10^{-10}$ is to be assumed when taking conversion into account. Herefrom there follows a computed quadrupole moment of Lu^{175} of

$$Q_0 > 6,8 \cdot 10^{-24} \text{ cm}^2$$

There are 1 figure, and 11 references, 5 of which are Slavic.

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56-6-37/47

Quadrupole Moments of the Even Isotopes of Osmium and Lutetium 175

ASSOCIATION: Leningrad Physico-Technical Institute AN USSR
(Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR)

SUBMITTED: August 2, 1957

AVAILABLE: Library of Congress

Card 2/2

BERLOVICH, E. Ye.

AUTHORS: Berlovich, E. Ye., Grotovskiy, K. M., Bonits, M. P., Gorodinskiy, G. M. 56-6-38/47

TITLE: The Life of a 264 KeV-Level of the Er^{167} Nucleus (Vremya zhizni urovnya yadra Er^{167} s energiyey 264 KeV)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1957, Vol. 33, Nr 6, pp. 1523 - 1524 (USSR)

ABSTRACT: By means of coincidence measurements the half-life of the 264 KeV-level of the Er^{167} nucleus was measured at $T_{1/2}=(2,0\pm0,5).10^{-9}$ s and herefrom a half-life of radiation of $T = 1,4 \cdot 10^{-8}$ s was computed.
The quadrupole moment computed herefrom is greater by the factor 2 than the measured one. This discrepancy is probably due to the inaccurate determination of the E 2 and M 1 ratio of this γ-transition. There are 1 figure, and 8 references, 7 of which are Slavic.

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The Life of a 264 KeV-Level of the Er^{167} Nucleus

56-6-38/47

ASSOCIATION: Leningrad Physico-Technical Institute AN USSR
(Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR)

SUBMITTED: August 2, 1957

AVAILABLE: Library of Congress

Card 2/2

BERLOVICH, E. Ye., GROTOVSKIY, K.†, BONITZ, M.††, BRESLAV, V. I.†††, and PREOBRAZHENSKIY, B. K.††††

"Investigation of the Life-Times of Lower Nuclear Levels Excited in Electron Capture." Nuclear Physics, Vol. 6, No. 5, 672-685, No. Holland Publ. Co. 1958

Physico-Tech. Inst. Acad. Sci. USSR, Leningrad.

† on leave from Inst. Nuclear Research, Polish Acad Sci
†† on leave from Inst. Exptl Nuclear Research, Dresden, GDR.
††† On leave from Inst. Physics Riga, Latvian SSR.
†††† On leave from the Khlopin Radium Inst, AS USSR, Leningrad

SOV-120-58-1-15/43

AUTHORS: Berlovich, E. Ye. and Shilyayev, B. A.

TITLE: A Study of the Time Properties of Photomultipliers using the Method of Delayed Coincidences (Issledovaniye vremennykh svoystv fotoumnozhiteley metodom zaderzhannykh sovpadeniy)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 1, pp 62-68 (USSR)

ABSTRACT: The method of delayed coincidences was applied to the determination of the rise time of photoelectric multipliers. For the photomultipliers FEU-1V the rise times are between 10^{-9} and 2×10^{-9} while for the photomultipliers FEU-19 the rise time is of the order of 4.5×10^{-9} sec. The effect of the rise time of a current pulse from a photomultiplier on time measurements was investigated. The following results were obtained: (a) the time constant for the luminescence of stilbene measured, using the FEU-1V photomultiplier, was found to be 5.7×10^{-9} sec; (b) the half-life of the excited states of the nuclei of Pr^{141} ($T_{1/2} = 2.0 \times 10^{-9}$ sec) and Tl^{203} ($T_{1/2} = 2.7 \times 10^{-10}$ sec). It was shown that the efficiency of the coincidence scheme using FEU-1V was close to

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A Study of the Time Properties of Photomultipliers using the Method of Delayed Coincidences.

100% for $2\tau_0 = 7 \times 10^{-9}$ sec while in the case of the FEU-19 saturation sets in at $2\tau_0 = 2.6 \times 10^{-8}$ sec. There are 10 figures, 8 references, of which 5 are English, 3 are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Institute of Physics and Technology of the Academy of Sciences, USSR)

SUBMITTED: May 11, 1957.

1. Coincidence counting--Equipment 2. Photomultipliers--Performance
3. Photomultipliers--Test results 4. Stilbenes--Luminescence
5. Praseodymium isotopes (Radioactive)--Half life

SOV-120-58-1-16/43

AUTHOR: Berlovich, E. Ye.

TITLE: A Differential Time Analyzer for Measuring Time Intervals of 10^{-8} - 10^{-10} sec (Differentsial'nyy vremennoy analizator dlya izmereniya intervalov vremeni $10^{-8} \div 10^{-10}$ sek)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 1, pp 68-72 (USSR)

ABSTRACT: Results of time measurements in the range 10^{-8} - 10^{-10} sec were given in Refs.1-4 by the present author. A more detailed description of the analyzer used for this purpose is now given. The apparatus is designed to be used in the measurement of lifetimes of excited states of nuclei and the velocity spectra of neutrons and charged particles by the method of delayed coincidences. The resolving time of the coincidence circuit incorporating FEU-IV photomultipliers was down to 2 x 10^{-9} sec so that time intervals down to 10^{-10} sec could be measured. A circuit diagram of the fast part of the device is shown in Fig.2. The radiation causing coincidences produces scintillations in the phosphors of the electron photomultipliers. The negative pulses at the anodes of these multipliers are applied to the grids of limiting pentodes and after amplitude standardization by them

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A Differential Time Analyzer for Measuring Time Intervals of 10^{-8}-10^{-10} sec.

are sent along coaxial cables to a variable delay line in which coincidences can be produced. The pulses are then applied to a germanium diode which will let through only coincident pulses. Fig.3 shows a typical curve for $\beta\gamma$ and $\gamma\gamma$ coincidences for the transition $Co^{60} \rightarrow Ni^{60}$. The half-width at half-height of this curve is 2×10^{-9} sec. The circuit works on the initial and steepest part of the pulses. There are 4 figures and 5 references, of which 4 are Soviet and 1 is English.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Institute of Physics and Technology of the Academy of Sciences of the USSR)

SUBMITTED: June 14, 1957.

1. Time--Measurement 2. Differential analyzers--Equipment
3. Differential analyzers--Performance 4. Particles--Velocity

24(5) SOV/56-36-5-57/76

AUTHORS: Berlovich, E. Ye., Fleysher, V. G., Breslav, V. I., Preobrazhenskiy, B. K.

TITLE: The Quadrupole Moment of the Er^{168}-Nucleus (Kvadrupol'nyy moment yadra Er^{168})

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, pp 1589-1590 (USSR)

ABSTRACT: The 80 kev level of Er^{168} formed in the K-capture in Tu^{168} has already been identified as the first level of the rotation band. Measurements of the lifetime of this level carried out by the authors also permit determination of the quadrupole moment and the deformation parameter of the Er^{168}-nucleus according to Bohr's formulas of the generalized nuclear model. The authors investigated the weak Tu^{168}-source which they obtained by constant irradiation of tantalum by 660 Mev protons on the synchrocyclotron of the Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) by means of a device already described in an earlier paper (Ref 4). The coincidence

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curves obtained are shown by a figure; the two curves correspond to the coincidence of the X-rays accompanying K-capture and of the conversion electrons formed in transitions from the 80 kev level. For the half life of this level $(1.8\pm0.3).10^{-9}$sec is obtained. By considering the conversion on the L shells (the values of the conversion coefficients are taken from references 5 and 6) $T_{\gamma} = (1 + \alpha)T_{exp} = (15\pm2.5).10^{-19}$sec is obtained for the radiation half-life ; α denotes the total conversion coefficient. The external quadrupole moment Q is found to amount to $Q = (7.6\pm0.6).10^{-24}cm^2$, and the deformation parameter: 0.32 ± 0.03. This value, which was determined from lifetime, agrees well with that determined from Coulomb excitation. There are 1 figure and 7 references, 4 of which are Soviet.

ASSOCIATION: Leningradskiy Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Leningrad Physico-Technical Institute of the Academy of Sciences, USSR)

S/048/60/024/03/13/019
B006/B014

AUTHOR: Berlovich, E. Ye.

TITLE: Some Uses of the Coincidence Method in Nuclear Spectroscopy

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 3, pp. 336-349

TEXT: The article under review was read at the Tenth All-Union Conference on Nuclear Spectroscopy (Moscow, January 19 - 27, 1960). The author gives a detailed description of the method and its manifold uses, as well as numerous technical details of coincidence spectrometers. Some applications are described in the introduction: time-of-flight method (neutron spectroscopy), determination of the lifetime of unstable nuclei, and investigation of various problems of β-decay. The article under review only deals with applications in nuclear spectroscopy and with the special apparatus used in this field. First, the author describes the method which is known to be based on the simultaneous recording of two or more events taking place at the same time. The

Some Uses of the Coincidence Method in Nuclear Spectroscopy

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types of coincidence possible in spectroscopic analyses are given (p. 337) and described. Next, the author describes a dual coincidence scintillation spectrometer (as described in Ref. 3). This spectrometer uses FEU-33 photomultipliers and stilbene crystals (Fig. 1). The principle and mode of operation of a dual coincidence magnetic spectrometer is explained in the following. This instrument consists essentially of two wide-angle spectrometers of the sector type with improved focusing (cf. Ref. 16). Some details of the latter are described in more detail. Figs. 3 - 9 reproduce details of construction, Fig. 10 part of the β-spectrum of the ThB nucleus and the corresponding Fermi diagram, Fig. 11 the two-quantum coincidence curve (396 and 230 kev) of the Eu^{147} nucleus. Finally, the author gives a short description of the dual β-γ coincidence spectrometer (Fig. 12), which has already been described in Refs. 18-20. Fig. 13 shows a partial β-spectrum of the Rb^{86} nucleus and the corresponding Fermi diagram, which was obtained by means of a device of the above-mentioned type. In conclusion, it is shown that these coincidence spectrometers may be characterized by a quantity $\xi = \frac{\omega_1 \omega_2}{2\pi \eta_1 \eta_2}$.

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Some Uses of the Coincidence Method in Nuclear Spectroscopy

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B006/B014

For a dual magnetic spectrometer, ξ is $\approx 6 \cdot 10^7$, for a dual scintillation spectrometer, it is $\approx 5 \cdot 10^7$, and for a β-γ spectrometer, it is $\approx 2.5 \cdot 10^7$. (ω_1 and ω_2 apparently denote the solid angles that are characteristic of the light intensity of this instrument, τ denotes the resolving time, and η_1, η_2 denote energy resolution). The author thanks A. V. Kamayev, I. M. Belousov, A. I. Kislyakov, V. V. Il'in, and T. Bedike for their assistance. L. Groshev and L. Shavtvalov are also mentioned in this article. There are 13 figures, 1 table, and 20 references, 12 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR (Leningrad Institute of Physics and Technology of the Academy of Sciences, USSR)

VB

Card 3/3

S/048/60/024/012/010/011
B019/B056

AUTHORS: Berlovich, E. Ye., Il'in, V. V., Kislyakov, A. I., Nikitin, M. K., and Bedike, T.

TITLE: Study of the Probability of Rotational Transitions Between Rotational Levels of Er^{166} - and Tu^{169}-Nuclei

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 12, pp. 1492-1501

TEXT: The present paper was read at the 10th All-Union Conference on Nuclear Spectroscopy, which was held in Moscow from January 19 to January 27, 1960. The authors studied the lifetime of the first excited level (81 kev) of the Er^{166} nucleus and of the 118, 139, and 473 kev levels of the Tu^{169} nucleus. With a double magnetic coincidence spectrometer the coincidences e - e, β - e, Auger electron - e and Auger electron - Auger electron were measured. e denotes the internal conversion electrons and β the decay electrons. The double magnetic coincidence

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Study of the Probability of Rotational Transitions Between Rotational Levels of Er^{166} and Tu^{169}-Nuclei

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spectrometer is a combination of two magnetic spectrometers with sectors having an improved focusing, in which the magnetic fields may be changed separately. The decay curve of an 81-kev state of the Er^{166}-nucleus shown in Fig. 1 was determined by measuring the coincidences of the K-electrons of the 184-kev transition and the M-electrons of the 81-kev conversion transition. The lifetime of the first excited state (2^+) was found to be $(2.0\pm0.2)\cdot10^{-9}$ sec. On the basis of the transmutation scheme $Yb^{169} \rightarrow Tu^{169}$, the transitions between the rotational bands of the ground state, the lifetime of the 473-kev level, and the transitions between the levels of the various rotational bands are thoroughly studied. The results of the investigations of lifetime and spin of the individual levels are given in Fig. 3. The characteristics of the transitions between the levels of various rotational bands of Tu^{169} are given in a table. M.Ye. Voykhanskiy is mentioned. There are 6 figures, 1 table, and 30 references: 17 Soviet, 10 US, 1 German, and 2 Danish.

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Study of the Probability of Rotational Transitions Between Rotational Levels of Er^{166} and Tu^{169}-Nuclei

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B019/B056

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology of the Academy of Sciences USSR)

Text to this table: 1) Level energies. 2) Half-lives in seconds. 3) Transition energies. 4) Type of transition. 5) Relative intensity of the γ-lines. 6) α_{total}. 7) Experimental lifetime of γ-radiation, $\tau_{\gamma exp}$. 8) τ_{γ} calculated according to Weisskopf. 9) $\frac{\tau_{\gamma Weisskopf}}{\tau_{\gamma exp}}$.

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...ных двух порядка.

Характеристики переходов между уровнями разных ротационных полос Tu^{169}

1 Энергия уровня, kev	2 $T_{1/2}$, эксп, сек	3 Энергия перехода, kev	4 Тип перехода	5 Относительная интенсивность γ-линий	6 $\alpha_{полн.}$	7 $\tau_{эксп.}$, сек	8 $\tau_{Вайск.}$, сек	9 $P = \frac{\tau_{Вайск}}{\tau_{эксп}}$
316	$(6,7 \pm 0,2) \cdot 10^{-7}$	177	$E2$	5,6	0,54	$2,9 \cdot 10^{-8}$	$8,3 \cdot 10^{-8}$	$2,9 \cdot 10^{-3}$
		177	$M1$	25	0,87	$6,4 \cdot 10^{-6}$	$5,8 \cdot 10^{-12}$	$0,9 \cdot 10^{-6}$
		198	$E2$	4,6	0,45	$3,5 \cdot 10^{-8}$	$4,8 \cdot 10^{-8}$	$1,4 \cdot 10^{-3}$
		198	$M1$	46	0,83	$3,5 \cdot 10^{-6}$	$4,1 \cdot 10^{-12}$	$1,2 \cdot 10^{-6}$
		308	$E2$	18	0,05	$9,0 \cdot 10^{-6}$	$5,2 \cdot 10^{-9}$	$0,58 \cdot 10^{-3}$
379	$(3,6 \pm 0,1) \cdot 10^{-8}$	63	$E1$	65	0,9	$1,1 \cdot 10^{-7}$	$1,2 \cdot 10^{-12}$	$1,1 \cdot 10^{-5}$
		240	$E1$	1	0,03	$6,4 \cdot 10^{-8}$	$2,2 \cdot 10^{-14}$	$0,34 \cdot 10^{-6}$
		260	$E1$	8	0,03	$7,8 \cdot 10^{-7}$	$1,8 \cdot 10^{-14}$	$2,3 \cdot 10^{-8}$

Величина вероятности на единицу кратера для переходов 240 к...

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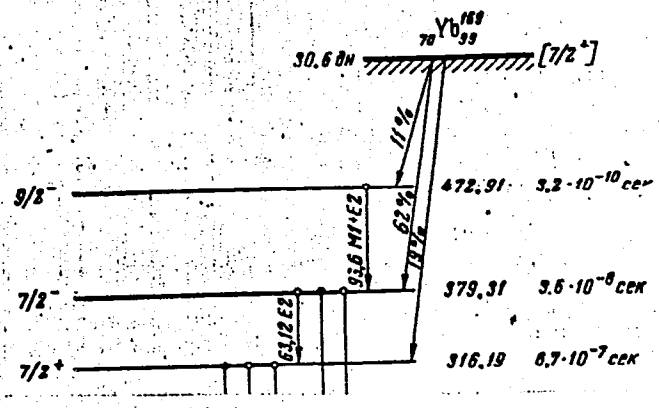
S/048/60/024/012/010/011
B019/B056



Card 5/6

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B019/B056

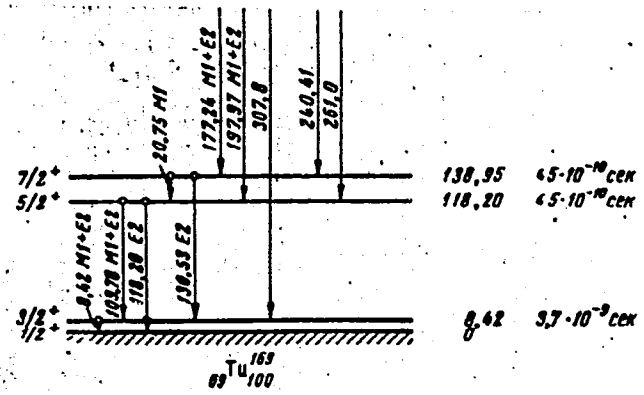

Рис. 3. Схема превращения $Yb^{169} \rightarrow Tu^{169}$. (Время жизни уровня 472,91 keV не $3{,}2 \cdot 10^{-10}$ сек, как ошибочно указано на рисунке, а $1{,}4 \cdot 10^{-10}$ сек)

Card 6/6

82517

S/020/60/133/04/10/031
B019/B060

24.6720

AUTHORS: Berlovich, E. Ye., Klement'yev, V. N., Krasnov, L. V., Nikitin, M. K., Yursik, I.

TITLE: New Isomeric States of Spherical Europium Nuclei With Odd Mass Number

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 4, pp. 789-792

TEXT: By way of introduction the authors refer to the investigations carried out by B. S. Dzhelepov and A. A. Bashilov (Ref. 1) into the level schemes of Eu^{147}-, Eu^{149}-, and Eu^{151} nuclei, that were determined by the spectra of internal conversion electrons and of photoelectrons. The principal part of these level schemes was studied by the authors with the coincidence method, and moreover, the lifetimes of the isomeric levels were found to be 624 kev (Eu^{147}), 496 kev (Eu^{149}), and 197 kev (Eu^{151}). A short description is given of the experimental setup consisting in the main of two scintillation spectrometers. The results are shown in three diagrams (Figs. 1, 2, and 3) in the form of the decay curves of the above-mentioned

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New Isomeric States of Spherical Europium Nuclei With Odd Mass Number

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three states as functions of the delay times, and the respective level schemes are explained. In the case of Eu^{147}, $7.8 \cdot 10^{-7}$ sec were measured for the half-lives of the 396-kev transition (M2), and $7.8 \cdot 10^{-6}$ sec for the 625-kev transition (E3). The corresponding values in Eu^{149} for the 346-kev transition (M2) and the 497-kev transition (E3) were $2.62 \cdot 10^{-6}$ sec and $5.24 \cdot 10^{-5}$ sec, respectively. $(5.8 \pm 0.3) \cdot 10^{-5}$ sec (175-kev transition, M2) are given for the half-life of the 197-kev state of the Eu^{151} nucleus, while a transition (E3) from 197-kev level to the ground state could not be established in this case. Table 1 gives the results of measurement found here for the three M2 transitions and the two E3 transitions. Details of these results are discussed and they are found to agree with the results given in a paper by V. S. Shpinel' on the variations in eigenstates. There are 3 figures, 1 table, and 8 references: 5 Soviet, 2 US, and 1 Danish.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Physico-technical Institute of the Academy of Sciences, USSR)

PRESENTED: March 10, 1960, by A. F. Ioffe, Academician

SUBMITTED: March 7, 1960

Card 2/2

BERLOVICH, E. Ye.

SOV/5914

PHASE I BOOK EXPLOITATION

Akademiya nauk SSSR. Fiziko-tekhnicheskiy institut im. A. F. Ioffe

Gamma-luchi (Gamma Rays) Moscow, Izd-vo AN SSSR, 1961. 720 p.
Errata slip inserted. 3300 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Fiziko-tekhnicheskiy institut im. A. F. Ioffe.

Resp. Ed.: L. A. Sliv, Doctor of Physics and Mathematics; Ed. of Publishing House: N. K. Zaychik; Tech. Ed.: A. V. Smirnova.

PURPOSE: This book is intended for theoretical and experimental physicists working in the field of nuclear spectroscopy and in related fields where gamma rays are utilized. It may also be useful to advanced students of physics.

COVERAGE: The book, representing a symposium of papers whose authors are specialists in their areas, attempts to provide the fullest possible coverage of theoretical and experimental methods of

89250

S/048/61/025/001/016/031
B029/B060

24.6720

AUTHORS: Berlovich, E. Ye., Larionov, O. V., Tunimanova, E. N., Khay, D. M.

TITLE: Study of the decay schemes of Gd^{146}, Gd^{147}, and Gd^{149} by a beta - gamma coincidence spectrometer

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 1, 1961, 90-97

TEXT: A study has been made of the cascade properties of transitions in gadolinium isotopes by the method of coincidences with a view to defining the details of the decay schemes of these isotopes. N. M. Anton'yeva, A. A. Bashilov et al. (Refs. 2,3,4), in their papers submitted to the 8th All-Union Conference on Nuclear Spectroscopy of 1958, had offered a thorough study of the spectra of conversion electrons of Gd^{146}, Gd^{147}, and Gd^{149}. B. S. Dzhelepov, V. A. Sergiyenko et al. (Refs. 5,6) studied the coincidences between the conversion electrons of these isotopes in 1959. Fig. 2 shows the block diagram of the coincidence spectrometer,

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Study of the decay schemes of...

consisting of two branches, used here. The two branches represent a sector-type magnet spectrometer with improved focusing and a scintillation spectrometer with a NaI crystal. The recorders were two time photomultipliers of the type ФЭУ-14 (FEU-14) after G. S. Vil'dgrube. Measurement results: Gd^{146}; Fig. 3 shows the curve of the coincidences of electrons of the K line of transition (114.8 + 115.5)kev with the gamma rays of the gadolinium fraction. The measurements took place 100 days after the separation of the fraction from the target irradiated with 660-Mev protons. Fig. 4 shows the analogous curve for the K line of the 155-kev transition. Two incompletely resolved coincidence peaks are observed; peak 1 characterizes the coincidences K114.8 - γ115.5 and 115.5 - γ114.8; peak 2 refers to K(114.8 + 115.5) - γ 155. The results found, while confirming the cascade property of all of the three transitions, do not, however, add any new information to the results given by B. S. Dzhelepov and V. A. Sergiyenko (Ref. 5). Still, they may be regarded as a good confirmation of the hitherto assumed decay scheme of Gd^{146}. Fig. 5 shows the peaks of the coincidences of the 229-kev electrons with the gamma rays (scintillation branch), and Fig. 6 shows the

Study of the decay schemes of...

peaks of the coincidences of the 396 kev-K-line electrons with the same gamma rays. The K229 electrons coincide with the 396-kev gamma rays. The peak of coincidences is, however, widened by an admixture of 370-kev gamma quanta. In the spectrum of coincidences there are still further, although not sharp, maxima, which correspond to the 560 ± 20, and 760 ± 25-kev energies, as well as a poorly marked coincidence peak in the 900-kev range. Weak maxima are also observed with 396-kev electrons, namely, in the 480 ± 30 and 560 ± 30-kev energy range. Figs. 7 and 8 show the coincidence curves of conversion K electrons of the 149.8 and 346-kev transitions with the gamma rays recorded in the scintillation branch. K 149.8 electrons provide coincidences with the 346 and 530 ± 20-kev gamma quanta. K 346 electrons provide coincidences with 150 and 298-kev gamma quanta. According to the results obtained, the 298-kev transition in the nucleus of $_{63}Eu^{149}$ is surely to be found in the 346- and 149.8-kev gamma cascade. This transition lies above the isomeric level and proceeds from the 795-kev level. Spin and parity $9/2^-$ or $11/2^-$ must be ascribed to this level. The intensities of 346 and 298-kev transitions are almost equally high. The excitation of the 497-kev level by electron capture is,

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in fact, more probable than the excitation of the 795-kev level. The other results found regarding the coincidences are in good agreement with the decay scheme of Gd^{149} suggested by N. M. Anton'yeva et al. (Ref. 3). The article under consideration is the reproduction of a lecture delivered at the 10th All-Union Conference on Nuclear Spectroscopy, which took place in Moscow from January 19 to 27, 1960. There are 11 figures, 1 table, and 9 references: 8 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Institute of Physics and Technology imeni A. F. Ioffe, Academy of Sciences USSR)

Legend to Fig. 2: 1) magnetic spectrometer (a) source container, (б) deflection chamber, (в) counter chamber, (г) source; 2) limiters; 3) variable delay line; 4) fast-coincidence block, (д) amplifier; 5) differential pulse height analyzer; 6) triple coincidence circuit; 7) counter.

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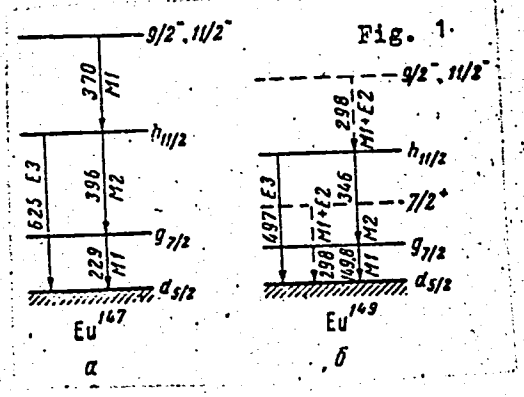
Study of the decay schemes of...

Fig. 1



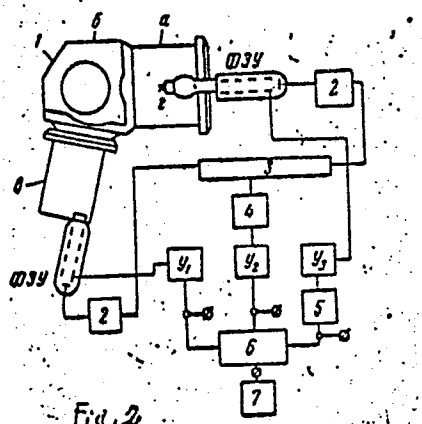


Fig. 2

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Study of the decay schemes of...

Fig. 3

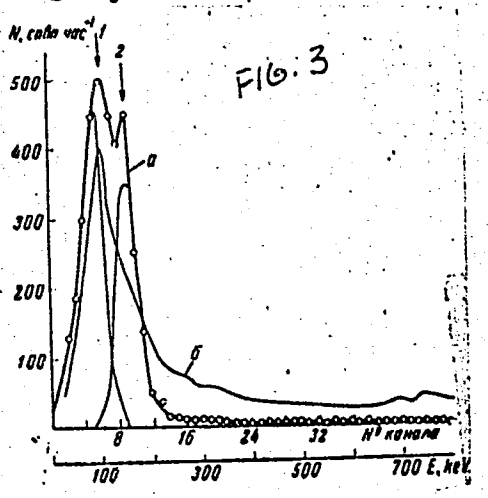
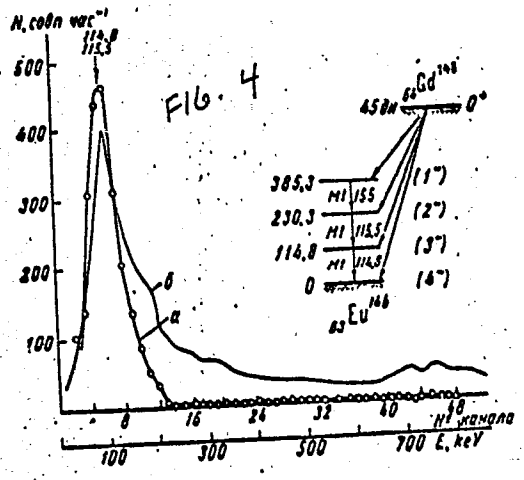


Fig. 4



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Study of the decay

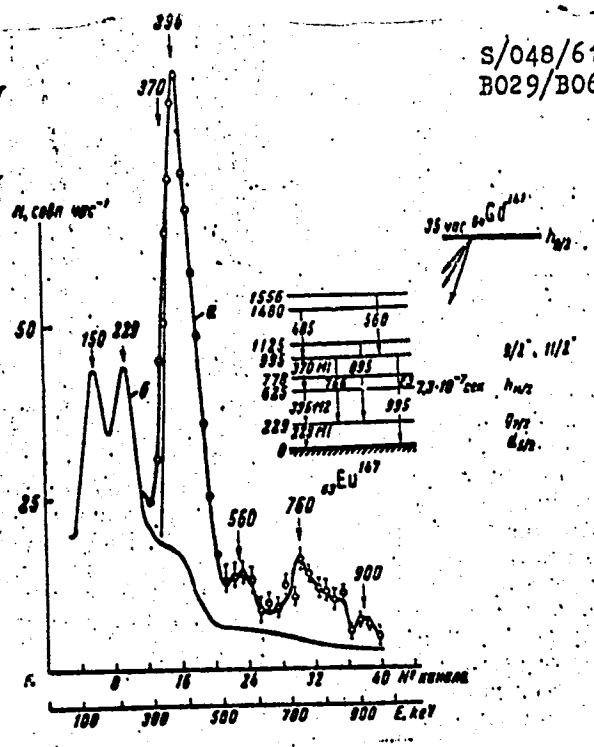

Fig. 5

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Study of the decay schemes of ...

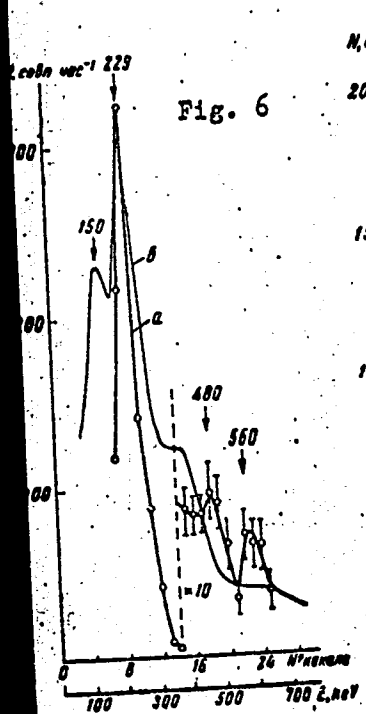

Fig. 6

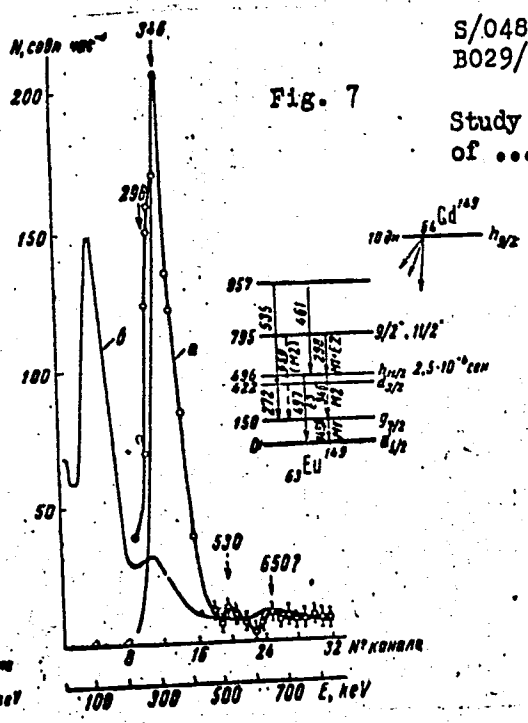

Fig. 7

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Study of the decay schemes of...

Fig. 8

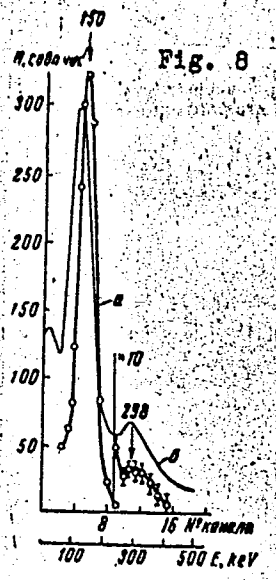
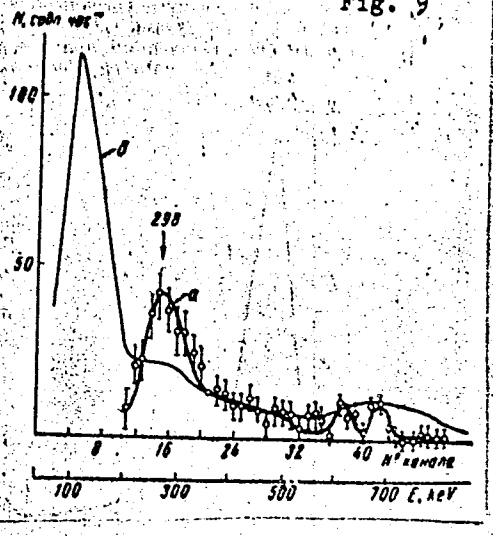


Fig. 9



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S/048/61/025/002/003/016
B117/B212

AUTHORS: Berlovich, E. Ye., Klement'yev, V. N., Krasnov, L. V., Nikitin, M. K.

TITLE: Gamma radiation of Eu^{146}

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 2, 1961, 207-211

TEXT: The present paper was read at the 11th Annual Conference on Nuclear Spectroscopy (Riga, January 25 to February 2, 1961). The authors have investigated gamma radiation caused by electron capture in Eu^{146}. The source was a gadolinium fraction that had been deposited chromatographically from a tantalum target. This target was bombarded with 660-Mev protons in a synchrocyclotron of the OIYaI (Joint Institute of Nuclear Research). The measurements have been made with a double coincidence scintillation spectrometer to one of whose branches a 100-channel pulse-height analyzer of the type АИ-100 (AI-100) had been connected. Photomultipliers of the type ФЭУ-14 (FEU-14) with 30 by 40 mm large NaI crystals were used. A number of gamma transitions which are produced during decay of Eu^{146} could be deter-

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mined by means of this spectrometer. Energies and relative intensities of these transitions are summarized in a table. The gamma-ray intensity was determined by splitting up the spectrum according to its standard lines. The intensity of the 0.64-Mev gamma-ray quanta is, according to an estimation, almost equal to that of 0.74-Mev gamma rays. The error of analysis is about 30%. In order to avoid the summation of specially intense and coinciding quanta of 0.64 and 0.74 Mev, lead filters, 6 to 28 g cm^{-2} thick, have been used to investigate the spectral region harder than 0.9 Mev. These tests confirmed a coincidence between quanta of 0.64 and 0.74 Mev (Ref. 1). Coincidences of 0.74-Mev quanta have been established with the following quanta: 0.64, 0.91, 1.07, 1.3, 1.5, 1.8, 2.1, and 2.4 Mev; also coincidences of 0.64-Mev quanta with those enumerated have been found, with the exception of 1.5 and 2.4 Mev. Besides, self-coincidences were observed which led to the assumption that a quantum with an energy of about 0.64 Mev is present. In addition, coincidences with various sections of the hard-spectrum range were investigated: 2.4, 2.1, 1.8, 1.5, 1.3, 1.1, and 0.9 Mev (Fig. 5). Based on the results obtained, the authors suggest a modified decay scheme for Eu^{146} (Fig. 6). According to the formula of Kameron, the decay energy from Eu^{146} to Sm^{146} amounts to 3350 kev while according to the

Gamma radiation of Eu^{146}

formula of Levi it is even 3700 kev (Ref. 4). Therefrom the conclusion may be drawn that newly introduced levels with energies of up to 3.5 Mev are present. Some of the transitions which occur in coincidences are probably individual components of the groups mentioned in the table (e.g., the 1.07-Mev line from the group with energies of 1.1 Mev). Gamma quanta with energies of 280 kev have been observed which coincide with 115÷120-kev quanta. These gamma rays apparently originate from a Gd^{146} or Eu^{146} decay. G. M. Gorodinskiy is mentioned. There are 6 figures, 1 table, and 4 Soviet-bloc references.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. I. Ioffe Akademii nauk SSSR (Institute of Physics and Technology imeni A. I. Ioffe of the Academy of Sciences USSR)

Fig. 5

E_γ, MeV	I_γ	E_γ, MeV	I_γ
0,64	~1	1,3 (1,26+1,31)	0,10
0,74	1,00	1,5 (1,45+1,56)	0,13
0,91	0,10	1,8	0,02
1,1 (1,07+1,17)	0,14	2,1 (1,94+2,06+2,19)	0,04
		2,4	0,01

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B117/B212

Gamma radiation of Eu^{146}

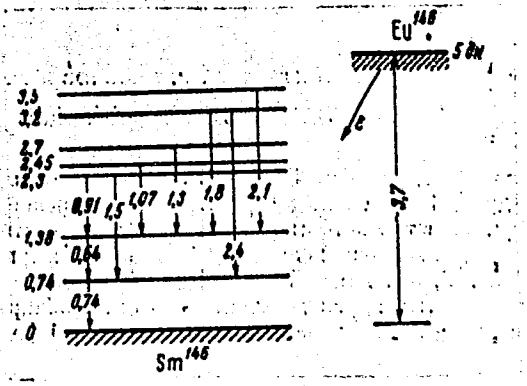

Fig. 6

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S/048/61/025/002/004/016
B117/B212

AUTHORS: Berlovich, Ye. E., Klement'yev, V. N., Krasnov, L. V., Nikitin, M. K.

TITLE: Study of the nuclear levels of Eu^{147}, Eu^{149}, and Eu^{151}

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 2, 1961, 212-217

TEXT: The present paper was read at the 11th Annual Conference on Nuclear Spectroscopy (Riga, January 25 to February 2, 1961). The authors investigated level schemes of Eu^{147}, Eu^{149}, and Eu^{151} by using a double-coincidence scintillation spectrometer. Unit and method have been briefly described in Ref. 3. The radiation source was a gadolinium fraction that had been separated from a group of rare earths and had been formed in a tantalum target bombarded with 660-Mev protons in a synchrocyclotron of the OIYaI (Joint Institute of Nuclear Research). The following gamma quanta were determined for the gamma spectrum of Gd^{147} by means of the scintillation spectrometer: 230, 380 (370÷396), 500, 750, 900, 1100, 1300, 1550, and 1750 Mev. For 230-kev gamma quanta prompt coincidences were established with the following

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quanta: 400, 550, 620, 770, 900, 1100, 1300, and 1550 kev; 1750-kev quanta did not coincide with those quanta enumerated. There are only X-rays in the coincidence spectrum with these gamma quanta. The delayed coincidences have also been investigated and coincidences of 370 and 930-kev quanta with 230, 400, and 625-kev quanta have been found. Coincidences of the same kind with gamma rays in an energy range of from 500-600 kev yielded the same quanta of 230, 400, and 625 kev. The coincidence spectrum with 930-kev quanta is brought as an example. The results obtained agree well with the decay scheme for Gd^{147}, as suggested in Ref. 1. Due to a complicated scheme and the presence of a large number of gamma transitions with energies close to each other, which could not be separated since the resolution of the spectrometer was not strong enough, it was not possible to verify the distribution of all gamma quanta as given in Ref. 1. The following gamma quanta have been established in the Gd^{149} spectrum: 150, 300, 350, 500, 790, and 940 kev. This is in agreement with data of Ref. 1. The 150-kev gamma quanta yielded prompt coincidences with 350, 520, and 790-kev quanta. In the delayed-coincidence spectrum for 150, 350, and 500-kev gamma quanta, there are 300-kev gamma quanta but no hard quanta with an intensity more than 15% above the 300-kev line intensity. The delayed spectrum for 300-

Study of the nuclear ...

kev gamma quanta shows that they coincide with 150, 350, and 500-kev quanta. The above measurements proved the assumption that the 300-kev transition occurs above the isomeric level. Refs. 2 and 3 showed the presence of an isomeric level above the 175-kev transition. By analyzing the delayed-coincidence spectrum it was established that 175-kev quanta coincide with the 155-kev quanta. Delayed-coincidences have not been found with 243-kev quanta, neither at the delay of these quanta nor at the delay of the quanta of the above mentioned spectrum. All this indicates that this transition does not occur above the isomeric level. The 243-kev gamma transitions and the 175-kev transitions are not in a prompt cascade since no 243-kev quanta have been established during tests with delayed coincidences when the 155-kev quanta had been delayed and the coincidences had been recorded by means of a total spectrum. The authors state that they have been successful in finding a 108-243-kev cascade which occurs between the known 352-kev level and the ground state of Eu^{151}. The 243-kev level is introduced therefore but it is mainly occupied by K-capture in Gd^{151}. V. A. Sergiyenko is mentioned. There are 10 figures and 7 references: 5 Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk

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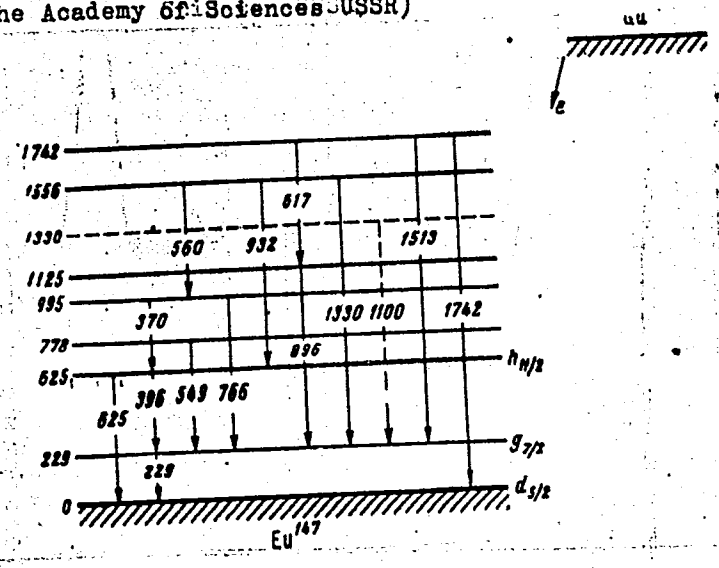
SSSR (Institute of Physics and Technology imeni A. F. Ioffe of the Academy of Sciences USSR)

Fig. 6



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S/048/61/025/002/005/016
B117/B212

AUTHORS: Berlovich, E. Ye., Bonits, M. P. (Polytechnic Institute, Dresden, Eastern Germany), Nikitin, V. V.

TITLE: Lifetime measurement of the first excited states of Tb^{159} and Yb^{173} by means of a multichannel time analyzer

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 2, 1961, 218-228

TEXT: Present paper was read at the 11th Annual Conference on Nuclear Spectroscopy (Riga, January 25 to February 2, 1961). The authors report on a time analyzer built by them, and suggest a method to check their chosen test conditions, i.e., how to avoid the time lag caused by the instrument. It follows from the circuit diagram (Fig. 1) that the instrument consists of a "slow" and a "fast" part. In the present paper, only the fast part is discussed (Fig. 2). The time and amplitude modulated pulses A and B, which can be used to measure the time delay, hit the spiral delay line Z_0 (Refs. 9, 10). The crystal diode D_1 of the type Д2В (D2V) serves as a rectifier. In

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Lifetime measurement of ...

a certain delay interval there is a linear dependence of the amplitude between the pulses A and B at the outlet I, which is a function of the magnitude of the delay. The crystal diode D_2 serves as coincidence control model. A positive displacement blocks the cathodes of these diodes for certain pulses. The pulse spectrum is via the amplifier passed on to the pulse-height analyzer which records the coincidence curves to be analyzed. The operation of the instrument is demonstrated by the self-coincidence and prompt coincidence curves. A crystal 30 by 30 mm gave the best time resolutions, about $5 \cdot 10^{-10}$ sec. The resolution decreased with larger crystals and lower radiation energy. This is a reason for the deviations of the maximum time resolution, which are shown on the coincidence curves, that were found during the determination of the lifetime of the first excited states of Tb^{159} and Yb^{173} with energies of 58 resp. 79 kev. One of the factors, which causes the shift in time of the coincidence curves as a function of the time lag caused by the instrument, is a wrong selection of intensities of the sources to be compared. This selection and also the form of the spectra in the operation range can be controlled easily by means of the "control of

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Lifetime measurement of ...

single curves". This method is based on the analysis of single pulses which pass through the blocked diode of the rectifier due to the presence of a parasitic capacity (C) and the finitness of the reverse resistance of the diode. The following features must be observed in a proper preparation of the experiments: 1) The required energy intervals have to be roughly selected for the source to be examined; 2) The integral intensities to be measured have to be equal to that of the control source; 3) the windows of the side channels have to be adjusted so accurately that position and form of the single pulse are the same for the control source and the one to be examined. During tests these conditions have been fülfilled. The evaluation of the curves obtained (Fig. 6) yielded the following results for the half-life of the 58-kev level of Tb^{159}: $T_{1/2} = (1.3 \pm 0.4) \cdot 10^{-10}$ sec. According to Ref. 18 this value was: $T_{1/2} < 10^{-9}$ sec. The following values have been determined for the half-life of the 79-kev state of Yb^{173}: $T_{1/2} = (3.8 \pm 0.5) \cdot 10^{-11}$ sec. The two transitions examined are almost purely magnetic dipole transitions. Table 2 shows a comparison between the authors' data and those of other authors. It is pointed out that the g-

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Lifetime measurement of ...

factors for the collective rotation are, according to the authors, calculated to be $(g_R)_{Tb^{159}} = 0.44 \pm 0.10$ and $(g_R)_{Yb^{173}} = 0.35 \pm 0.04$. Within the limits of observation errors, these values agree with estimations of a generalized model ($g_R = Z/A$) for a homogenous charge distribution, which is 0.41 for the first case and 0.4 for the second case. There are 7 figures, 2 tables, and 32 references: 7 Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Institute of Physics and Technology imeni A. F. Ioffe of the Academy of Sciences USSR)

Legend to Fig. 1: 1) Source; 2) photomultiplier; 3) tube limiter; 4) variable delay line; 5) converter control circuit for coincidence circuit; 6) cathode followers; 7) amplifiers; 8) differential discriminators; 9) triple coincidence switch; 10) constant delay; 11) pulse-height analyzer.
Legend to Fig. 2: A, B-coinci[redacted]pulses, Z_o-wave resistor of the variable delay lines D_1 and D_2 crystal diodes of the time-amplitude converter

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and of the control coincidence circuit, resp. r time interval between D_1 and D_2, C - parasitic capacities I, II outlets to the cathode followers.

Fig. 1

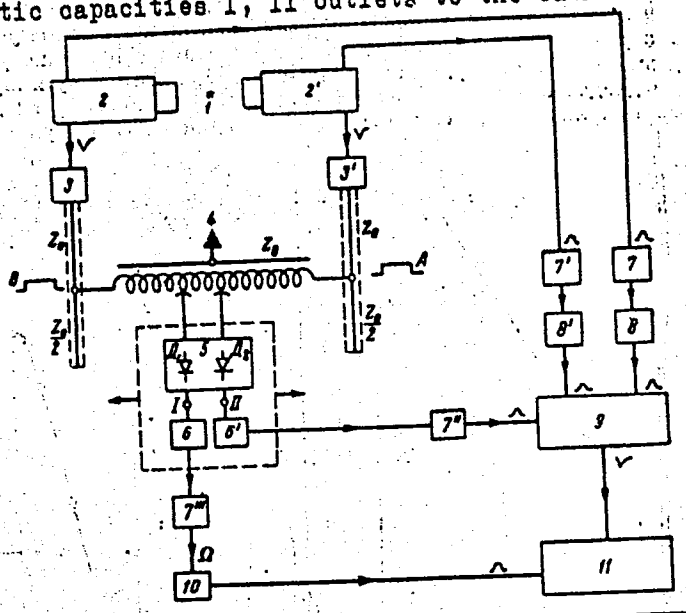

Fig. 1

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Lifetime measurement of ...

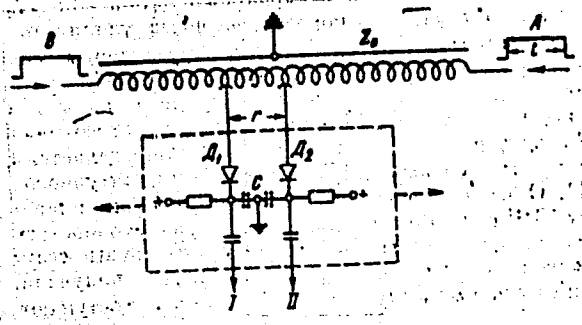

Fig. 2

Fig. 2.

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Lifetime measurement of

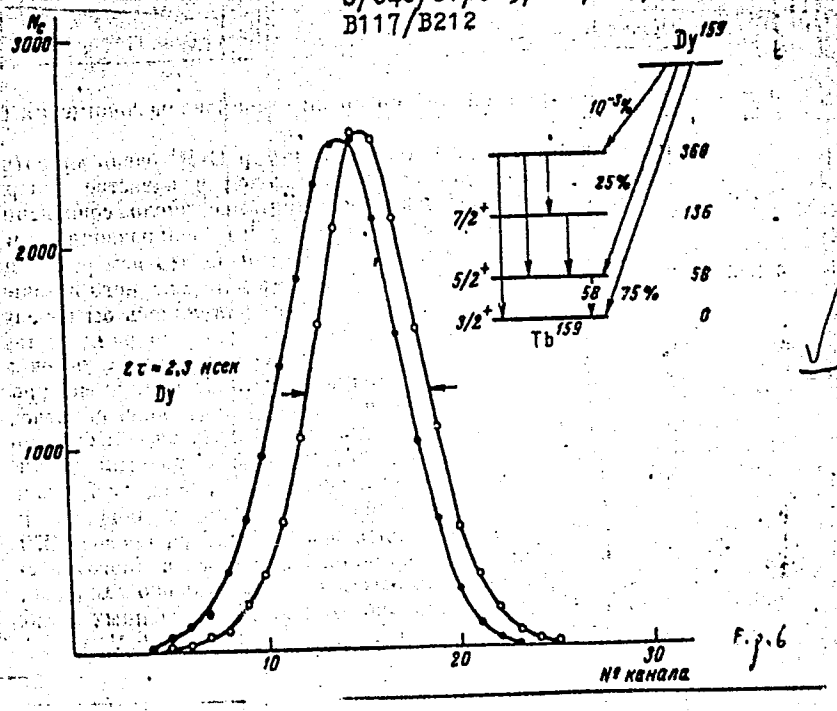

Fig. 6

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BERLOVICH, E.Ye.; BONITS, M.P.; GUSEV, Yu.K.; NIKITIN, M.K.

Probabilities of one-particle transitions in Yb^{173} nuclei. Izv.AN SSSR.Ser.fiz. 25 no.10:1275-1279 O '61. (MIRA 14:10)

1. Fiziko-tekhnicheskiy institut im. A.F.Ioffe Akademii nauk SSSR.
(Quantum theory) (Ytterbium)

BERLOVICH, Ye. E.

"Anomalies in Probabilities of El-Transitions to Rotational Band levels of Ground States in Deformed Odd-Mass Nuclei"

"On Gyromagnetic Rations for Collective Motion in Deformed Odd-Mass Nuclei"

"Contribution of Collective Motion to Removal of L-forbiddenness for ML transitions"

Paper presented at the "Electromagnetic Lifetimes and Properties of Nuclear States Conference, Gatlinburg Tenn., 5-7 Oct. 1961.

Leningrad Physico-Technical Institute, Leningrad.

BERLOVICH, E.Ye.; KLEMENT'YEV, V.N.; KRASNOV, L.V.; NIKITIN, M.K.

Gamma-transitions in the sm^{146} nucleus. Zhur. eksp. i teor. fiz. 40 no.1:375-377 Ja '61. (MIRA 14:6)

1. Leningradskiy fiziko-tekhnicheskiy institut AN SSSR.
(Gamma rays) (Samarium)

BERLOVICH, E.Ye.; BONITS, M.P.; NIKITIN, M.K.

g-Factors for collective and internal movements in Tb^{159} and Yb^{173} nuclei. Zhur.eksp.i teor.fiz. 40 no.3:749-751 Mr '61. (MIRA 14:8)

1. Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR. 2. Drezdenskiy politekhnicheskiy institut Germanskoy Demokraticheskoy Respubliki (for Bonits).

(Nuclei, Atomic) (Terbium--Isotopes) (Ytterbium--Isotopes)

34170
S/048/62/026/002/004/032
B101/B102

24.6210

AUTHORS: Badenko, I. I., Berlovich, E. Ye., and Fleysher, V. G.

TITLE: Slow electrons in the β^--decay of P^{32}

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 2, 1962, 197-201

TEXT: The ionization of the atomic shell in the β^--decay of P^{32} was examined. Slow electrons were recorded by a louver-type electron multiplier (EM) with 18 CuBe-alloy dynodes (amplification factor $\sim 10^5$). β-particles were recorded with an anthracene crystal, the scintillation pulses of which were fed to a photoelectric multiplier (PEM) through a light pipe. The energy of ionization electrons was determined by means of a retarding field. The pulses of EM and PEM were fed to a gate circuit with a time resolution of 0.5 μsec. The measurements were made at $1 \cdot 10^{-5}$ mm Hg. Sources: (1) a monomolecular cetyl phosphate source (activity ~ 0.003 μc per cm^2, layer thickness on collodion film $< 50\ \mu g \cdot cm^{-2}$);

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(2) a source obtained by boiling down a solution containing PO_4^{3-} and PO_3^- ions, enriched with P^{32} according to V. N. Nefedov et al. (Radiokhimiya, 1, 236 (1959)) (activity ~0.7 μc, layer thickness <10 $\mu g \cdot cm^{-2}$). Coincidences of beta particles with slow electrons (< 10 ev) were observed with both sources (Fig. 2). No coincidences took place when the active surface of the source faced the crystal. They did not change if the distance between the source and the first dynode was extended to 25 cm. Hence, there were no negative ions, but only ionization electrons knocked out of the outer shell. The M-electrons of phosphorus participate in the chemical binding with the four oxygen atoms of cetyl phosphate. Four σ bonds and one π bond are formed. $Z_{eff} < 5.4$ is found when allowing for σ-electron shielding and for the K- and L-shell electrons. The probability of outer shell ionization follows therefrom, calculated on the basis of hydrogen-like protons >3.5 % (experimental finding: 9 %). Electrons of more than 10 ev were not observed. Hence, $W_L < 1$ %, which differs from A. B. Migdal's results (Zh. eksperim. i teor. fiz., 10, 207 (1951)). The data allow the contribution of field-induced emission to be

estimated. Ye. L. Feynberg (Dokl. AN SSSR, 23, 778 (1939)) is mentioned. There are 2 figures and 14 references: 4 Soviet and 10 non-Soviet. The four most recent references to English-language publications read as follows: Boehm, F. W., Wu, C. S., Phys. Rev., 93, 518 (1954); Starfelt, N., Cederlund, J., Phys. Rev., 105, 241 (1957); Miskel, J. A., Perlman, M. L., Phys. Rev., 94, 1683 (1954); Schwartz, H. M., J. chem. Phys., 21, 45 (1953).

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR)

Fig. 2. Number of β^- e coincidences as a function of the stopping potential. (1) Monomolecular source. (2) Source obtained by evaporation. The scale of the ordinate axis differs for (1) and (2). (3) Number N_{e_T} of thermal electrons (emitted from tungsten wire) passing through the barrier grids as a function of the grid potential.

Legend: abscissa: V_{stop}; ordinate: N_{coinc} and N_{e_T} in arbitrary units.

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S/048/62/026/002/010/032
B101/B102

AUTHORS: Berlovich, E. Ye., Gusev, Yu. K., Il'in, V. V., Nikitin, V. V., and Nikitin, M. K.

TITLE: Probabilities of transitions between the lower levels of the Sm^{147} nucleus

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 2, 1962, 221 - 226

TEXT: In order to clarify the quantum characteristics of the lower levels of Sm^{147}, the lifetimes of 121- and 198-kev excited states were measured with the multichannel time analyzer described in Ref. 5 (see below). The source was Eu^{147} ($T_{1/2}$ = 24 days) which was obtained by chromatographic separation from a tantalum target bombarded with 660-Mev protons in the synchrocyclotron of the OIYaI. Eu^{147} was separated chromatographically after the 35-hr Gd^{147} had decayed. A study was made of the coincidence between the 676-kev gamma quanta, the emission of

Card 1/1 3

Probabilities of transitions...

which excites the 121-kev level, with the gamma quanta resulting from the discharge of this level. The gamma spectrum of Eu^{147} was recorded by means of NaI(Tl) crystals and an ФЭУ-33 (FEU-33) photomultiplier. The gamma-gamma coincidences of Eu^{147} and a comparison with the gamma-gamma coincidences of the Co^{60} reference source ($Co^{60} \longrightarrow Ni^{60}$) transition were used to calculate the lifetime of the 121-kev level: $T_{1/2} = (3.3 \pm 0.3) \cdot 10^{-10}$ sec. The coincidence of 600-kev gamma quanta with the conversion electrons of the 198-kev transition was examined at the 198-kev level. The gamma quanta were recorded by means of a stilbene crystal. The right-hand branch of the coincidence curve had a pronounced exponential course. It was found that $T_{1/2} = (1.31 \pm 0.05) \cdot 10^{-9}$ sec. These results can be brought into agreement with the sequence $7/2^-$, $5/2^-$, $3/2^-$, for the ground state and for the first two excited states. Since the 198-kev transition is a pure E2 transition which excludes the sequence $f_{7/2}$, $h_{9/2}$, $f_{5/2}$, there must be a prohibition which suppresses

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the M1 component. The results exclude a lifetime of the 121-kev state in the microsecond range. There are 5 figures and 12 references: 10 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: Ref. 5: Bonitz, M., Berlovich, E., Nucl. Instr. and Methods, 9, 13 (1961); Bay, Z., Phys. Rev., 77, 419 (1950).

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR)

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S/056/62/042/004/007/037
B102/B104

AUTHORS: Berlovich, E. Ye., Gusev, Yu. K., Il'in, V. V., Nikitin, V. V., Nikitin, M. K.

TITLE: Contribution of collective motion to the lifting of the l-forbiddance

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 4, 1962, 967-972

TEXT: Continuing earlier studies (DAN SSSR, 133, 789, 1960; Nucl. Phys. 23, 481, 1961), the authors determined the lifetimes of the M1 transitions of the type $g_{7/2} \rightarrow d_{5/2}$ for the spherical nuclei $Eu^{147,149,151}$ just before the range of great deformations, where the collective motion is strongest. It can be assumed that collective motion affects the probability of l-forbidden transitions if the number of neutrons is below the critical (N = 89) and the nucleus is still spherical. The experiments were made with Gd fractions of Ta targets irradiated with 660-Mev protons in the synchrocyclotron of the OIYaI, a multi-channel time analyzer, a scintillation spectrometer with NaI-crystal and an ФЭУ-33 (FEU-33)
Card 1/2

multiplier. Results: Eu^{147}, first excited level 229.5 kev ($g_{7/2}$), lifetime $(1.8 \pm 0.2)\cdot10^{-10}$ sec; M1 transition to ground state ($d_{5/2}$), delay factor F = 115; total internal-conversion coefficient $\alpha = 0.195$. Eu^{149}, first excited level 150 kev ($g_{7/2}$), lifetime $(3.2 \pm 0.2)\cdot10^{-10}$ sec; M1 transition to the ground state ($d_{5/2}$), F = 78; $\alpha = 0.63$. Eu^{151}, first excited level 21.7 kev ($g_{7/2}$), lifetime $(3.4 \pm 0.2)\cdot10^{-9}$ sec; M1 transition to ground state ($d_{5/2}$), F = 47; $\alpha = 29.1$. The low values of the F-factors and their smooth decrease when approaching the range of deformed nuclei, in the nuclear range considered, indicate an increasing contribution of collective motion in the real nuclear wave functions, leading to progressive weakening of the l-forbiddance. There are 4 figures and 1 table.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR (Leningrad Physicotechnical Institute of the Academy of Sciences USSR)

SUBMITTED: November 11, 1961

Card 2/2

S/056/62/043/005/010/058
B102/B104

AUTHORS: Berlovich, E. Ye., Gusev, Yu. K., Il'in, V. V., Nikitin, M. K.

TITLE: Lifetimes of the excited states of deformed Dy^{160}, Lu^{175}, Hf^{177}, and Ir^{191} nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 5(11), 1962, 1625-1635

TEXT: A time - pulse-height converter and a differential time analyzer with variable delay line were used to study the lifetimes of some excited states of deformed nuclei. For Dy^{160} the decay curves of

$$Er^{160} \xrightarrow[\varepsilon]{30\ hr} Ho^{160} \xrightarrow[\beta^+,\varepsilon]{5\ hr} Dy^{160}$$

were used to calculate the lifetimes of the first excited states by the method of least squares. Results:

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Lifetimes of the excited states of ...

86.5 kev (2^+) : $T_{1/2} = (1.7 \pm 0.1) \cdot 10^{-9}$ sec; E2 transition to ground state(0^+);
283 kev (4^+) : $T_{1/2} = (7.1 \pm 0.9) \cdot 10^{-11}$ sec; E2 transition to first level;
966 kev (2^+) : $T_{1/2} \lesssim 7 \cdot 10^{-12}$ sec; E2 transition to the ground state.
The lifetimes of the first and third excited states of Hf^{177} were determined from the β^- decay of Lu^{177} (6.8 d). Results:
113 kev ($9/2^-$):$T_{1/2}=(4.2 \pm 0.3) \cdot 10^{-10}$sec; transition to ground state ($7/2^-$)
321 kev($9/2^+$):$T_{1/2} =(6.9 \pm 0.3) \cdot 10^{-10}$sec; transitions to ground state, first, and second (250 kev, $11/2^-$) excited states. The lifetimes of the first and third excited states of Lu^{175} were determined from the β^- decay of Yb^{175}(6.8 d). Results:
114 kev($9/2^+$): $T_{1/2}=(1.1 \pm 0.1) \cdot 10^{-10}$sec; (M1+E2) transition to ground state
396 kev($9/2^-$): $T_{1/2}=(3.25 \pm 0.10) \cdot 10^{-9}$sec; (E1+M2) transitions to ground

APPROVED FOR RELEASE: 06/08/2000 CIA-RDP86-00513R000205010007-6"

state ($3/2^+$) and to the first excited level and E1 transition to the second level (251.5 kev, $11/2^+$). The lifetime of the first excited level of Ir^{191}, 129.6 kev ($5/2^+$), was determined in β-decay of Os^{191}(15 d), and found to equal $(8.1\pm1.6)\cdot10^{-11}$ sec. This value agrees with data from the Mössbauer effect. The results are compared with the predictions of the generalized nuclear model of Bohr-Mottelson and some nuclear parameters are calculated. For the internal quadrupole moment of the band, calculated from the lifetimes of the first and second rotational level of Dy^{160}, the values $(8.0\pm0.5)\cdot10^{-24}cm^2$ and $(8.5\pm1.1)\cdot10^{-24}cm^2$ were obtained which agree within the error limits. $B(E2;4\rightarrow2)/B(E2;2\rightarrow0) = 1.68\pm0.17$. The empirical transition probabilities for the Hf^{177} levels being

$$W_{\gamma321} = 2{,}6\cdot10^7\,сек^{-1}, \qquad W_{\gamma208} = 8{,}5\cdot10^8\,сек^{-1}, \qquad W_{\gamma72} = 5{,}7\cdot10^7\,сек^{-1}.$$

Lifetimes of the excited states of ...

and the theoretical values calculated with Nilssons formula (Kgl. Danske Vid. Selskab. Mat.-Fys. Medd., 29, 16, 1955) being

$$W_{H321} = 1{,}67 \cdot 10^{10}, \quad W_{H308} = 1{,}04 \cdot 10^{9}, \quad W_{H72} = 1{,}15 \cdot 10^{7}.$$

the retardation factors are obtained as

$$f_{H321} = 650, \quad f_{H308} = 1{,}13, \quad f_{H77} = 1{,}54.$$

The corresponding quantities for Lu^{175} are

$$W_{Y316} = 1{,}2 \cdot 10^{8}, \quad W_{Y206} = 5{,}7 \cdot 10^{9}, \quad W_{Y145} = 8 \cdot 10^{6},$$
$$W_{H356} = 1{,}18 \cdot 10^{10}, \quad W_{H282} = 9{,}76 \cdot 10^{8}, \quad W_{H145} = 1{,}32 \cdot 10^{7}.$$

$$f_{H316} = 105, \quad f_{H282} = 17, \quad f_{H145} = 1{,}6.$$

The table gives among others the g-factors of collective (g_R) and internal (g_K) motion, and μ in nuclear magnetons. There are 9 figures and 1 table.

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S/056/62/043/005/010/058
B102/B104

Lifetimes of the excited states of ...

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR)

SUBMITTED: June 9, 1962

Table

	E_γ, keV	$\delta^2 = \frac{E2}{M1}$	Q_0, 10^{-24} cm^2	μ, n. m.	$B(M1)$, $(eh/2Mc)^2$	δR	δK
Hf^{177}	113	34	7,76	+0,61	$5,2 \cdot 10^{-4}$	0,20	+0,17
Lu^{175}	113,83	0,25	7,45	+2,0	$6,67 \cdot 10^{-4}$	0,29	+0,65
Ir^{191}	129,6	0,14	4,25	+0,17	$4,8 \cdot 10^{-3}$	0,46	—0,12

Card 5/5

ACCESSION NR: AR4022431 S/0058/64/000/001/A027/A027

SOURCE: RZh. Fizika, Abs. 1A257

AUTHOR: Berlovich, E. Ye.; Bocharkin, V. K.

TITLE: Single channel time analyzer with automatized control

CITED SOURCE: Tr. 5-y Nauchno-tekhn. konferentsii po yadern. radioelektronike. T. 2. Ch. 1. M., Gosatomizdat, 1963, 124-134

TOPIC TAGS: single channel analyzer, single channel time analyzer, time of flight spectroscopy, neutron spectroscopy, excited nucleus lifetime, programmed analyzer

TRANSLATION: A single-channel time analyzer is described, intended for the measurement of the lifetimes of excited states of nuclei and for neutron time-of-flight spectroscopy. The measurement range of this analyzer is somewhat less than 1 microsecond. The entire opera-

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ACCESSION NR: AR4022431

tion of the analyzer is fully automatized and the analyzer can operate in accordance with a specified program during an established time interval. The features of the circuit and of the construction of the analyzer are described in detail. The relative advantages and shortcomings of this analyzer as compared with other single-channel analyzers described in the literature are discussed.

DATE ACQ: 03Mar64 SUB CODE: PH ENCL: 00

Card 2/2

AP4010296

S/0048/64/028/001/0080/0087

AUTHOR: Berlovich, E.Ye.; Gusev, Yu.K.; Khay, D.M.; Shenaykh, I.

TITLE: Lifetimes of levels of W^{182}, Pr^{144} and Eu^{151} /Report, Thirteenth Annual Conference on Nuclear Spectroscopy held in Kiev, 25 Jan to 2 Feb 1963/

SOURCE: AN SSSR. Izvestiya, Seriya fizicheskaya, v.28, no.1, 1964, 80-87

TOPIC TAGS: level lifetime, γ-transition, quadrupole moment, multipole order, retardation factor, speed up factor, tungsten 192, praseodymium 144, europium 151

ABSTRACT: The paper gives the results of determining the lifetimes of the 100.1 and 1289.7 keV states of W^{182}, the 100 keV state of Pr^{144} and the 21.7 keV state of Eu^{151}. The Ta^{182} and Ce^{144} sources for investigating the lifetimes of the W^{182} and Pr^{144} levels were obtained by the (n,γ) reaction using neutrons from the pile of the imeni A.F.Ioffe Physical-Technical Institute, while the Gd^{151} source (for studying Eu^{151}) was obtained by spallation of a tantalum target with 660 MeV protons from the synchrocyclotron of the OIYaI (Joint Institute for Nuclear Research). The experimental procedures, which were based on measuring β-γ and β-conversion electron coincidences are described for each isotope. The lifetime values obtained for

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AP4010296

the investigated levels are the following: W^{182} 100.1 keV T = (1.4 ± 0.1) x 10^{-9} sec; W^{182} 1289.7 keV T = (1.05 ± 0.05) x 10^{-9} sec; Pr^{144} 99.95 keV state T = (0.95 ± 0.08) x 10^{-9} sec; Eu^{151} 21.7 keV T = (7.2 ± 0.7) x 10^{-9} sec. The value of the quadrupole moment of the ground state of W^{182}, calculated on the basis of the lifetime of the first excited state, Q_0 = 6.4 barns, which is significantly less than the value obtained by averaging the results of Coulomb excitation experiments: Q_0 = 6.75 barns. In view of this there were analyzed the analogous data for other even-even nuclei at the border of the region of deformation (from Hf^{176} to Os^{190}). It was found that there is a consistent divergence between the quadrupole moments obtained on the basis of the lifetime measurements and Coulomb excitation measurements (An exception is Hf^{176} for which the two values agree.) The data on the other investigated transitions are discussed with a view to evaluating their multipole orders and retardation or speeding up factors. Some analogies are drawn with transitions in other nuclei located at the boundary of the region of deformed nuclei. Orig. art. has: 2 tables and 5 figures.

2/3

Card

AP4010296

ASSOCIATION: Fiziko-tekhnicheskiy institut im.A.F.Ioffe, Akademii nauk SSSR (Physical-Technical Institute, Academy of Sciences, SSSR)

SUBMITTED: 00 DATE ACQ: 10Feb64 ENCL: 00

SUB CODE: NS NR REF SOV: 009 OTHER: 013

3/3
Card

ACCESSION NR: AP4024038 S/0048/64/028/002/0214/0221

AUTHOR: Berlovich, E.Ye.; Bukat, G.M.

TITLE: Probabilities for magnetic dipole transitions in nuclei forbidden by orbital momentum selection rules /Report, Fourteenth Annual Conference on Nuclear Spectroscopy held in Tbilisi 14 to 22 Feb., 1964/

SOURCE: AN SSSR. Izvestiya, Seriya fizicheskaya, v.28, no.2, 1964, 214-221

TOPIC TAGS: transition probability, magnetic dipole transition, orbital momentum forbidden transition, orbital momentum forbiddenness, transition matrix element, configuration mixing, proton transition, neutron transition, heavy element

ABSTRACT: The paper is devoted to review and analysis of the available data on forbidden magnetic dipole transitions, i.e., transitions forbidden by the orbital selection momentum rule, with a view to elucidating the nature of these transitions. The data, including the lifetimes, hindrance factors, calculated matrix elements and configurations involved for $1g_{7/2} \rightarrow 2d_{5/2}$ and $2d_{3/2} \rightarrow 3s_{1/2}$ proton transitions and $2d_{3/2} \rightarrow 3s_{1/2}$ neutron transitions are tabulated. The variation of the matrix elements with A for the proton transitions is plotted in the range from A = 129 to A =

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ACCESSION NR: AP4034038

= 205. The following conclusions are drawn regarding the nature and characteristics of magnetic dipole transitions forbidden with respect to orbital momentum: 1. The widely held view that the matrix element for proton transitions differ little in value and that the hindrance factor clusters about the mean value F = 300 is erroneous. Actually even for $g_{7/2} \rightarrow d_{5/2}$ transitions the hindrance factor varies in the range from about 100 to 3300. 2. The smallest values of the matrix elements (largest values of F) are observed near the neutron shell with N = 82 and close to the double-magic region Z = 82, N = 126. 3. The rapid increase of the matrix element with approach to the region of deformed nuclei of the rare earth group indicates that in addition to configuration mixing a substantial role in removal of l forbiddenness is played by interaction of the particles with the nuclear surface. 4. The theoretical matrix elements calculated taking into account configuration mixing can be reconciled with the experimental values only for nuclei located near one or two closed shells. To obtain better agreement of the theoretical matrix elements with the experimental ones in the entire investigated nuclear region it is essential to carry out the calculations not in the framework of perturbation theory but in the manner employed in the work of L.A.Sliv and his co-workers (Zhur.eksp.i teor.fiz. 40,341,1961; Ibid.40,946,1961; Izv.AN SSSR,Ser.fiz.26,227,1962) for nuclei close to Z = 82, N = 126; in such calculations there must be taken into account pairing

Card 2/3

ACCESSION NR: AP4024038

forces, pair correlations and coupling with the surface. Orig.art.has: 2 figures and 4 tables.

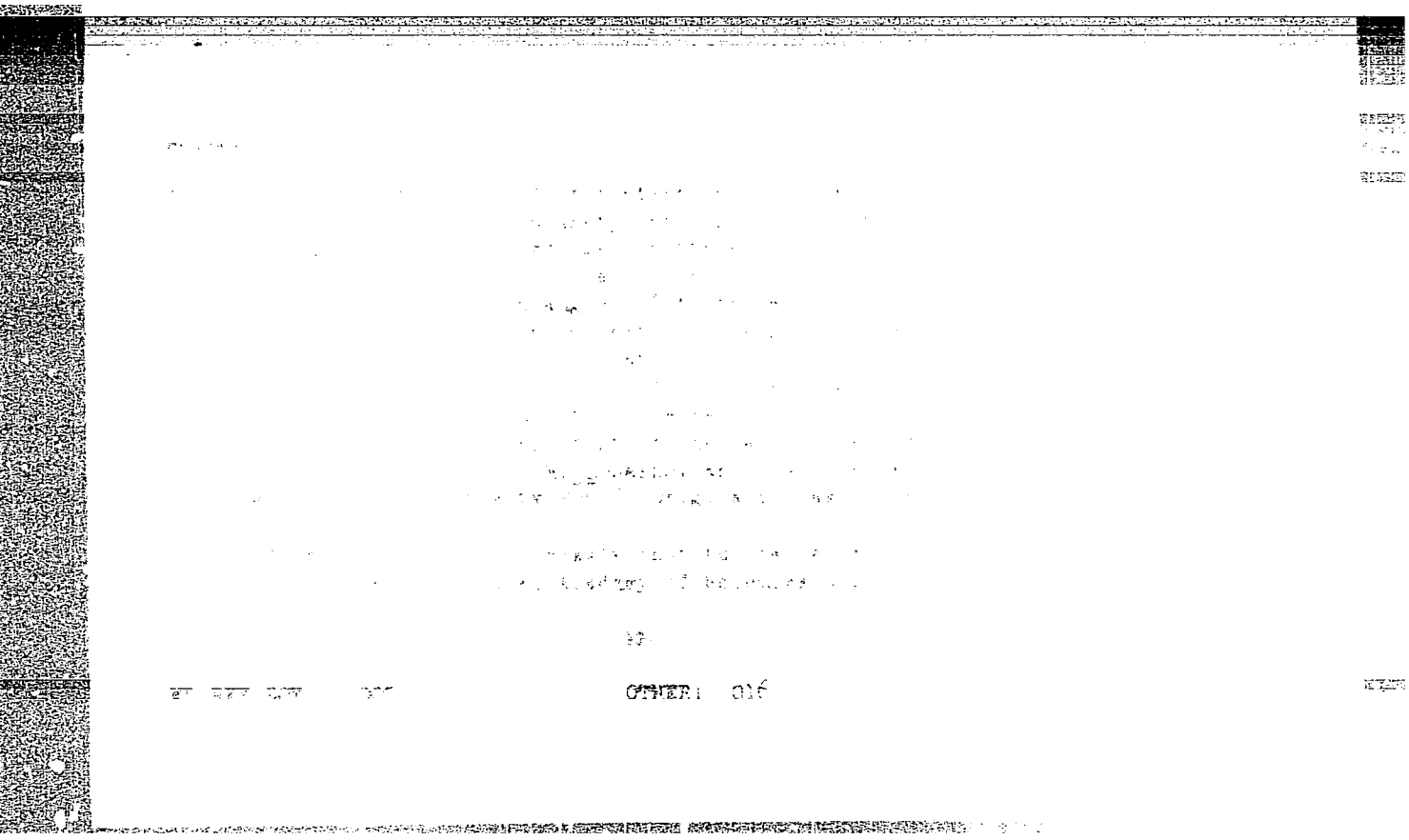
ASSOCIATION: none

SUBMITTED: 14Sep63 DATE ACQ: 08Apr64 ENCL: 00

SUB CODE: NS NR REF SOV: 007 OTHER: 021

Card 3/3

1013-1021 ... Teoreticheskoy Fiziki, v. 48, no. 4, ...



BERLOVICH, E.Yo.

Characteristics of electric dipole transitions in odd deformed nuclei. Izv. AN SSSR. Ser. fiz. 29 no.5:838-845 My '65. (MIRA 18:5)

1. Fiziko-tekhnicheskiy institut im. A.F.Ioffe AN SSSR.

BERLOVICH, E.Ye.; MEYLING, V.; TARASOV, V.K.

Applicability of the Ikegami - Udagava method in allowing for pair correlations when calculating the probability of electromagnetic transitions in deformed nuclei. Izv. AN SSSR.Ser. fiz. 29 no.5:846-848 My '65. (MIRA 18:5)

1. Fiziko-tekhnicheskiy institut im. A.F.Ioffe AN SSSR.
2. TSentral'nyy institut yadernykh issledovaniy, Rossendorf, Germanskaya Demokraticheskaya Respublika (for Meyling).

BERLOVICH, E.Ye.; KUTSENTOV, L.M.; FLEYSHER, V.G.

Study of the "shaking" of electron shells of oriented molecules containing P^{32}. Zhur. eksper. i teor. fiz. 48 no.4:1013-1021 Ap '65. (MIRA 18:5)

1. Fiziko-tekhnicheskiy institut imeni Ioffe AN SSSR.

L 9295-66 EWT(m)/EWP(t)/EWP(b) DIAAP/IJP(c) JD/JG

ACC NR: AP5026408 SOURCE CODE: UR/0386/65/002/006/0281/0284

AUTHOR: Berlovich, E. Ye.; Novikov, Yu. N.

ORG: Physicotechnical Institute im. A. F. Ioffe, Academy of Sciences SSSR (Fiziko-tekhnicheskiy institut Akademii nauk SSSR)

TITLE: On the shape of odd nuclei of the transition region

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 6, 1965, 281-284

TOPIC TAGS: nuclear structure, deformed nucleus, europium, promethium, transition element

ABSTRACT: The authors have calculated the equilibrium deformations of odd-proton nuclei by the method of B. R. Mottelsson and S. G. Nilsson (Mat.-fyz. Dan. Vid. Selskab v. 1, No. 8, 1959), without allowance for the pairing forces. The agreement between the values calculated by the authors and the experimental ones for nuclei with $N = 90$ (Eu^{153}, Pm^{151}) and $N = 88$ (Eu^{151}) leads to the conclusion that the role of pairing in the establishment of the equilibrium form becomes appreciable only when $N < 88$. Comparison of the experimental value of the deformation for Pm^{147} ($\delta = 0.075$) with the calculated value ($\delta = 0.13$) makes it possible to assess the influence of the pairing forces in other nuclei of the transition region. The calculated delay factors for M1-transitions and the acceleration factors for E2 transitions between the first-excited and the ground levels of odd-proton nuclei of the transition region are tabu-

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L 9295-66

ACC NR: AP5026408

lated. It is concluded that the odd-neutron nuclei of the transition region are spherical and only for N = 89 (Sm^{151}) does the shape become ellipsoidal. The properties of odd-neutron nuclei can be described by the phonon model with account of pairing. From the aggregate of the obtained properties of the odd-proton nuclei of the transition region it follows that these nuclei have small equilibrium deformations, which increase gradually with increasing number of neutrons, up to N = 88. On going from N = 88 to N = 90, the deformation increases more abruptly, and this increase is accompanied by change in the state of the unpaired proton (in Eu^{153} and Pm^{151}). This deduction refutes the widespread opinion that the transition of the nuclear shape from spherical is always abrupt. Orig. art. has: 1 table.

SUB CODE: 18/ SUBM DATE: 23Jul65/ ORIG REF: 003/ OTH REF: 004

Card 2/2

BERLOVICH, E.Ye.

Some properties of odd nuclei of the intermediate region.
Izv. AN SSSR. Ser. fiz. 29 no.12:2177-2197 D '65.
(MIRA 19:1)

BERLOVICH, E.Ye.; NOVIKOV, Yu.N.

Effect of a change in nuclear structure on the probability of beta decay. Dokl. AN SSSR 165 no.5:1026-1028 D '65.
(MIRA 19:1)

1. Fiziko-tekhnicheskiy institut im. A.F.Ioffe AN SSSR. Submitted July 23, 1965.

ACC NR: AP7001348 SOURCE CODE: UR/0386/66/004/011/0481/0484

AUTHOR: Berlovich, E. Ye.

ORG: Physicotechnical Institute im. A. F. Ioffe, Academy of Sciences SSSR (Fiziko-tekhnicheskiy institut Akademii nauk SSSR)

TITLE: Influence of the mean field on the character of variation of the nuclear shape

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 11, 1966, 481-484

TOPIC TAGS: quadrupole moment, deformed nucleus, nuclear structure, even even nucleus, proton, neutron

ABSTRACT: This is a continuation of earlier work (Izv. AN SSSR ser. fiz. v. 31, 1967, in press) where an analysis of the experimental data on the quadropole moments of even-even deformed nuclei has shown that the change in the internal quadrupole mement on... going from an even-even nucleus to an odd one is determined essentially by the quantum characteristics of the particular orbit which is populated by the added nucleon. In the present article it is shown on this basis, using additional data on the changes of the quadrupole mement of spherical and nonspherical nuclei, that the observed jumplike change in the shape of even-even nuclei when $N < 90$ is closely connected with the properties of the mean field in the region of the nuclei in question. The connection between the change in the quadrupole moment, the change in the nuclear deformation, and the directions of the proton and neutron orbitals is discussed, and it is con-

ACC NR: AP7001348

cluded that the character of the change of the nuclear shape is determined to a considerable degree by the properties of the levels of the mean field.

SUB CODE: 20/ SUBM DATE: 12Jul66/ ORIG REF: 003/ OTH REF: 004

Card 2/2

L 41319-66 EWT(m)/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6019605 (A,N) SOURCE CODE: UR/0048/66/030/002/0194/0197

AUTHOR: Berlovich, E.Ye.; Golovin, V.V.; Polyakov, A.G.; Khodzhayev, M.; Khaydarov, T.

ORG: none

60
B

TITLE: Lifetime of the first excited state of Sm-149 /Report, Fifteenth Annual Conference on Nuclear Spectroscopy and Nuclear Structure, held at Minsk, 25 Jan. to 2 Feb. 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 2, 1966, 194-197

TOPIC TAGS: nuclear spectroscopy, nuclear structure, excited state, half life, gamma ray, conversion electron, phonon, samarium

ABSTRACT: The authors have measured the lifetime of the 22.5 keV first excited state of Sm^{149}. The source was obtained by bombarding terbium with 680 MeV protons for 5 hours and separating the europium fraction 5 months later. ^{149}Eu decays by electron capture to ^{149}Sm. Delayed coincidences were recorded between the gamma rays from the 328 keV transition to the 22.5 keV level and conversion electrons from the decay of that level. The gamma rays were detected with an NaI crystal scintillator, and the conversion electrons, with a thin (0.5 mm) plate of anthracene. The halflife of the 22.5 keV level was found to be $(6.9 \pm 0.5) \times 10^{-9}$ sec, in agreement with the finding of O.C.Kistner, A.C.Li, and S.Monaro (Phys. Rev., 132, 1733 (1963)) and in disagreement with that of R.Leonard, S.Iha, and G.Lang (Bull.Amer.Phys.Soc.,Ser.II, 8, No.1,

Card 1/2

BERLOVICH, I.

Place the simplification and reduction of the apparatus under strict control. Fin.SSSR 23 no.11:34-40 N '62. (MIRA 15:12)
(Industrial management)

ZVEREV, A.G.; POPOV, V.F.; FADEYEV, I.I.; BABUSHKIN, V.I.; BERLOVICH, I.L.; BOCHKO, A.M.; BURLACHENKO, S.Ye.; GARBUZOV, V.F.; DMITRICHEV, P.Ya.; DUNDUKOV, G.F.; ZLOBIN, I.D.; KOROVUSHKIN, A.K.; KORSHUNOV, A.I.; KUZIN, M.G.; KUTUZOV, G.A.; LYSKOVICH, A.A.; MASHTAKOV, A.M.; MIKHEYEV, V.Ye.; NIKEL'BERG, P.M.; POSKONOV, A.A.; ROMANOV, G.V.; SOSIN, I.F.; SOSNOVSKIY, V.V.; POVOLOTSKIY, M.M.; URYUPIN, F.A.; KHARIONOVSKIY, A.I.; CHULKOV, N.S.; SHESHERO, N.A.; SHITOV, A.P.; SHUVALOV, A.M.; YANBUKHTIN, K.Kh.

Arsenii Mikhailovich Safronov; obituary. Fin.SSSR 18 no.11:95 N '57. (MIRA 10:12)
(Safronov, Arsenii Mikhailovich, 1903-1957)

BERLOVSKIY, A.Ya.

Protective devices for the storage of sealed radioactive substances. Vest.rent. i rad. 34 no.3:61-65 My-Je '59.
(MIRA 12:10)

1. Iz fizicheskoy laboratorii (zav. - dotsent M.N.D'yachenko) Khar'kovskogo instituta meditsinskoy radiologii (dir. - dotsent Ye.A.Bazlov).

(RADIATION PROTECTION, appar. & instruments
device for storage of sealed radioactive substances (Rus))

BERLOVSKIY, A.Ya.

Radiation protection in work with radioactive capsules. Vest. rent.i rad. 35 no.1:51-54 Ja-F '60. (MIRA 13:6)

1. Iz fizicheskoy laboratorii (zav. - dotsent M.N. D'yachenko) Khar'kovskogo instituta meditsinskoy radiologii (dir. - dotsent Ye.A. Baslov).
(RADIATION PROTECTION)

BERLOVSKIY, A.Ya.

Semiautomatic line production for work with ampullated radioactive sources in gynecology. Med. rad. 5 no.8:54-62 '60. (MIRA 13:12)
(RADIATION PROTECTION) (GYNECOLOGY)

BERLOVSKIY, A.Ya.

Protective apparatus for dosimetric intracavitary and intratissue administration of radioactive colloidal gold. Med.rad. no.7:68-70 '61. (MIRA 15:1)

1. Iz Khar'kovskogo instituta meditsinskoy radiologii.
(GOLD--ISOTOPES) (RADIOGRAPHY--EQUIPMENT AND SUPPLIES)

BERLOVSKIY, A.Ya.

Comparative merits of external gamma- and x-irradiation; discussion of M.S. Ovoshchnikov and A.M.Semenova's paper on "Therapeutic and diagnostic use of radioactive isotopes." Med. rad. 6 no.2:72-74 '61. (MIRA 14:3)

(RADIOISOTOPES)

BERLOVSKIY, A. Ya.

Safety problems of work with closed radioactive sources in clinical practice. Med. rad. 8 no.4:68-73 Ap'63 (MIRA 17:2)

1. Iz Khar'kovskogo instituta meditsinskoy radiologii.

BERLOVSKIY, A.Ya.

Technique of the clinical use of radioactive cobalt beads.
Vop. onk. 9 no.1:111-114 '63. (MIRA 16:5)

1. Iz Khar'kovskogo instituta meditsinskoy radiologii (direktor Shantyr', V.I.).
(COBALT ISOTOPES—THERAPEUTIC USE) (CANCER)

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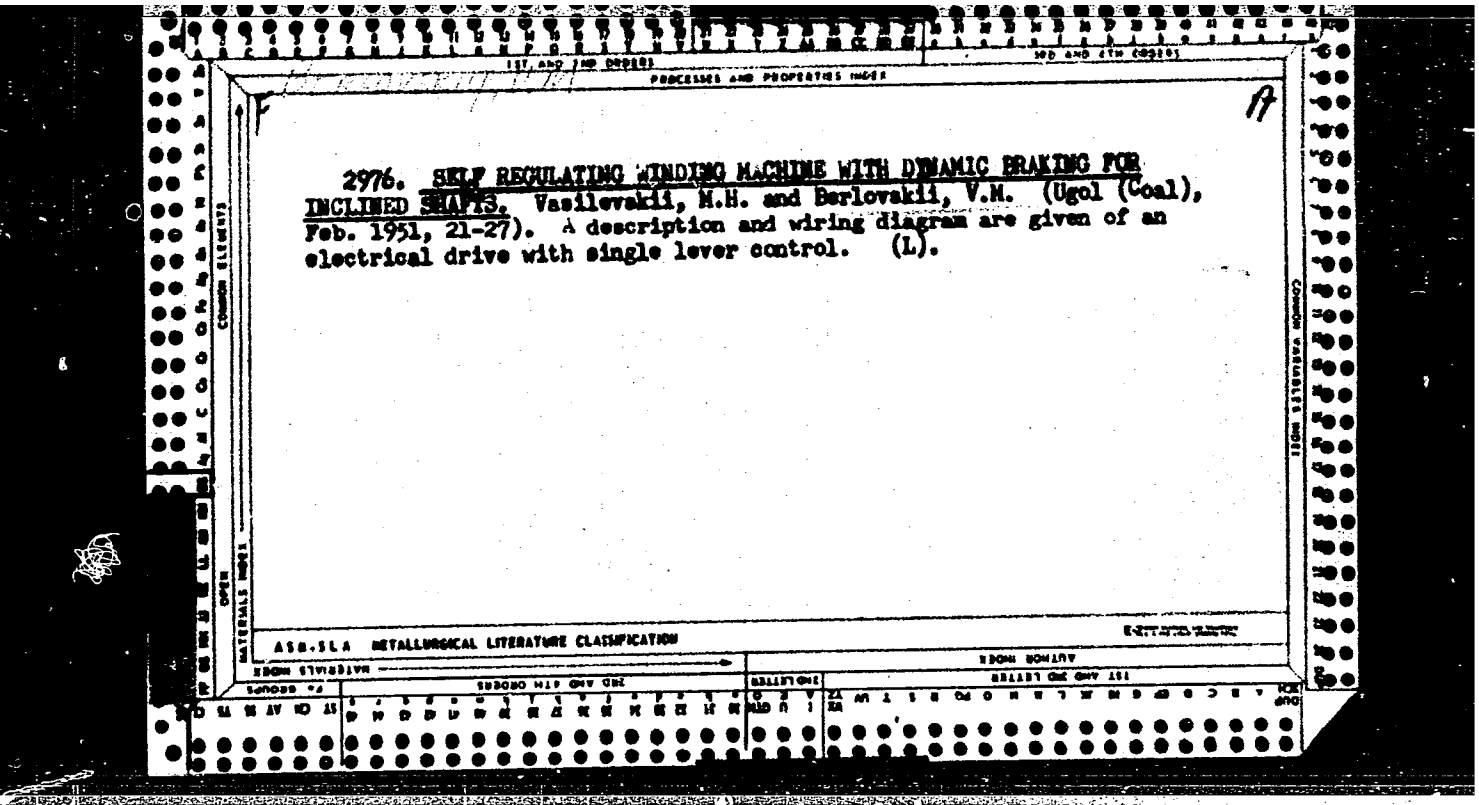
(Rubber, Synthetic)



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